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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/520,678	03/07/2000	Michael Tipping	1018.093US1	9074

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EXAMINER

MAKHDOOM, SAMARINA

ART UNIT	PAPER NUMBER
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2123

DATE MAILED: 01/15/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/520,678

Applicant(s)

TIPPING ET AL.

Examiner

Samarina Makhdoom

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 March 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4. 6) ☐ Other: _____

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DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

2. **Claims 1-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hearst et al., "Support Vector Machines," IEEE 1998, in view of Cortes et al., U.S. Patent No.5,684,929.**

As per Claims 1, 7, 10, and 17, Hearst et al teach a computer-implemented method for a vector machine with a data set comprising:

selecting an initial set of hyperparameters for determining a prior distribution for the data set for modeling thereof (See page 18, left column for Hyperplane classifiers for hyperparameters used to design learning algorithms) ,

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the prior distribution approximated by a product of a distribution of the set of hyperparameters (See Page 19, Figures 1, and 2 for hyperplane and hyper parameters and the weights given to the distribution), a distribution of a set of weights, and a distribution of a set of predetermined additional parameters (See Page 22, right column for distribution of weights for learning vector machines. Also see page 22, Table I and left column for additional parameters for different learning algorithms);

and, iteratively updating the distribution of the set of weights, the distribution of the set of hyperparameters (See page 19, left column for training patterns that iteratively train the learning machine by updating the weights and parameters),

and the distribution of the set of predetermined additional parameters until a predetermined convergence criterion has been reached (See Page 19, left column for the final decision function or the convergence criterion to end the iterations),

such that the product of the distribution of the set of hyperparameters, the distribution of the set of weights (See Figure 1, Page 19 for the weight vector \mathbf{w}), and the distribution of the set of predetermined additional parameters as have been iteratively updated approximates the posterior distribution for modeling of the data set (See Page 18, left column for distribution functions and statistical analysis, the posterior distribution is a type of probability distribution and statistical function).

Hearst et al., used the data set to train the vector machine but do not explicitly model the data set.

Cortes et al., teach modeling a data set (See Col. 4, lines 50-60 for modeling a training data set).

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It would have been obvious for one of ordinary skill in the art at the time the invention was made to train the vector machine of Hearst et al., with the modeled data set of Cortes et al., because it would allow Hearst et al., more flexibility on the types of data sets used to train the vector machine making the vector machine more efficient.

As per Claims 6 and 16, Hearst et al teach a computer-implemented method comprising:
inputting a data set to be modeled (inputting data is inherent to modeling a data set);
determining a relevance vector learning machine via a variational approach to obtain a posterior distribution for the data set (See Page 18, left column for determining distribution functions and statistical analysis in a vector learning machine, the posterior distribution is a type of probability distribution and statistical function);

and, outputting at least the posterior distribution for the data set (outputting calculated values is inherent to modeling data).

As per Claim 13, Hearst et al, disclose a machine-readable medium having instructions stored thereon for execution by a processor to perform a method for modeling a discrete data set comprising:

selecting an initial set of hyperparameters for determining a prior distribution for the discrete data set for modeling thereof (See page 18, left column for Hyperplane classifiers for hyperparameters used to design learning algorithms),

the prior distribution approximated by a product of a distribution of the set of hyperparameters, a distribution of a set of weights, and a distribution of a set of parameters accounting for a lower bound (See Page 19, Figures 1, and 2 for hyperplane and hyper

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parameters and the weights given to the distribution), a distribution of a set of weights, and a distribution of a set of predetermined additional parameters (See Page 22, right column for distribution of weights for learning vector machines. Also see page 22, Table I and left column for additional parameters for different learning algorithms);

and, iteratively updating the distribution of the set of weights, the distribution of the set of hyperparameters (See page 19, left column for training patterns that iteratively train the learning machine by updating the weights and parameters),

and the distribution of the set of parameters accounting for a lower bound until a predetermined convergence criterion has been reached (See Page 19, left column for the final decision function or the convergence criterion to end the iterations),

such that the product of the distribution of the set of hyperparameters, the distribution of the set of weights, and the distribution of the set of parameters accounting for a lower bound as have been iteratively updated approximates the posterior distribution for modeling of the discrete data set (See Page 19, Figures 1, and 2 for hyperplane and hyper parameters and the weights given to the distribution), a distribution of a set of weights, and a distribution of a set of predetermined additional parameters (See Page 22, right column for distribution of weights for learning vector machines. Also see page 22, Table I and left column for additional parameters for different learning algorithms).

As per Claims 2-3, 11-12, and 14-15, Hearst et al., teach all the limitations of Claims 1 and 6 above but do not explicitly mention inputting and outputting the modeled data set.

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Cortes et al. teach initially inputting the data set to be modeled (See Col. 1, lines 13-24 for inputting a data set). Cortes et al. also teach outputting the posterior distribution as approximated by the product of the distribution of the set of hyperparameters, the set of weights, and the set of predetermined additional parameters (See Col. 1, lines 13-24 for outputting a data values and parameters).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Hearst et al. with the input and output steps of Cortes et al. because it would make Hearst et al. calculations more efficient by having the steps of inputting and outputting the data set values and corresponding parameters.

As per Claims 4-5, 8-9, and 18-19 Hearst et al., teach all the limitations of Claims 1 and 6 above but do not explicitly mention discrete and continuous modeled data sets.

Cortes et al. teach the data set comprises a continuous data set, such that the set of predetermined additional parameters comprises a set of parameters accounting for noise (See Col. 1, lines 13-24 for using a data set. A Continuous data set is a type of data set and noise is a parameter inherent to machines). Cortes et al. teach the data set comprises a discrete data set, such that the set of predetermined additional parameters comprises a set of parameters accounting for a lower bound (See Col. 1, lines 13-24 for using a data set. A discrete data set is a type of data set and can be selected to represent an upper or lower bound).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the data distribution calculations of Hearst et al. with the continuous and

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discrete data sets of Cortes et al. because it would make Hearst et al. calculations more versatile, efficient, and accurate by having data sets representing different statistical conditions.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. **Claims 1-12 and 14-19 are rejected under 35 USC 101 because the claimed invention is directed to non-statutory subject matter.**

Specifically, claims 1-12 and 14-19 recite steps that perform mathematical algorithms, and are an abstract idea solving mathematical equations (numbers to numbers) without a practical application. Thus, the claims do not pass muster under the useful, concrete, and tangible result criteria. See *State Street Bank & Trust v Signature Financial Group Inc.* 47 USPQ 2d 1596 (Fed. Cir. 1998) and *AT&T Corp. v Excel Communications Inc.* 50 USPQ 2d 1447 (CAFC 1999).

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Hearst, M.A.; Dumais, S.T.; Osman, E.; Platt, J.; Scholkopf, B, "Support vector machines," *Intelligent Systems*, IEEE, Volume: 13 Issue: 4, Jul/Aug 1998, Page(s): 18-28

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Wahba, G.; Yi Lin; Hao Zhang , "Margin-like quantities and generalized approximate cross validation for support vector machines," Proceedings of the 1999 IEEE Signal Processing Society Workshop Neural Networks for Signal Processing IX, Aug 1999, Page(s): 12 -20

Sollich, P., "Probabilistic interpretations and Bayesian methods for support vector machines," Ninth International Conference on Artificial Neural Networks, ICANN 99. Conf. Publ. No. 470, Volume: 1, Page(s): 91 -96.

Chiang et al., U.S. Patent No. 5,720,003 teach a method for determining the accuracy limit of a learning machine.

Tatsuoka, U.S. Patent No. 5,855,011 teach a method for classifying a test subject of states in a domain.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samarina Makhdoom whose telephone number is 703-305-7209. The examiner can normally be reached on Full Time, on Tuesday, Thursday, Friday, and Sunday.

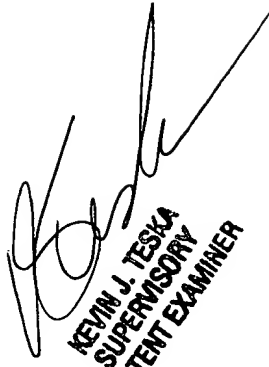
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kevin J. Teska can be reached on 703-305-9704. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-0040 for regular communications and 703-305-0040 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

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SM

January 12, 2003



KEVIN J. TESKA
SUPERVISORY
PATENT EXAMINER